

## THAT WHICH IS CLAIMED IS:

1. An isolated polynucleotide encoding DsrA, the polynucleotide selected from the group consisting of:
  - (a) DNA having the nucleotide sequence of **SEQ ID NO:1**;
  - (b) DNA having the nucleotide sequence selected from the group consisting of **SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, and SEQ ID NO:17**;
  - (c) polynucleotides that hybridize to DNA of (a) or (b) above under stringent conditions and which encode DsrA; and
  - (d) polynucleotides that differ from the DNA of (a) or (b) or (c) above due to the degeneracy of the genetic code, and that encode DsrA encoded by a DNA of (a) or (b) above.
2. An isolated polynucleotide according to Claim 1 that encodes DsrA.
3. An isolated polynucleotide that encodes DsrA, wherein the DsrA has the amino acid sequence given herein as **SEQ ID NO:2**.
4. An isolated polynucleotide that encodes DsrA, wherein the DsrA has and amino acid sequence selected from the group of **SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, and SEQ ID NO:18**.
5. An isolated polynucleotide according to Claim 1 which is a DNA having the nucleotide sequence given herein as **SEQ ID NO:1**.
6. An isolated protein encoded by a polynucleotide according to Claim 1.
7. An isolated and purified protein having the amino acid sequence selected from the group consisting of **SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, and SEQ ID NO:18**.

8. An expression vector comprising a polynucleotide according to Claim 1.
9. A cell containing an expression vector according to Claim 8.
10. A cell containing an expression vector according to Claim 8 and capable of expressing DsrA.
11. An antibody that specifically binds to a protein encoded by a polynucleotide according to Claim 1.
12. An antibody according to Claim 11, wherein said antibody is a polyclonal antibody.
13. An antibody according to Claim 11, wherein said antibody is a monoclonal antibody.
14. An antisense oligonucleotide complementary to a polynucleotide of Claim 1 and having a length sufficient to hybridize thereto under physiological conditions.
15. A DNA encoding an antisense oligonucleotide of Claim 14.
16. An expression vector comprising an antisense oligonucleotide according to Claim 14.
17. A method for producing a protein comprising the amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, and SEQ ID NO:18, or a fragment thereof, comprising
  - (a) culturing a host cell containing an expression vector containing at least a fragment of a polynucleotide sequence encoding DsrA under conditions suitable for the expression of the protein; and
  - (b) recovering the protein from the host cell culture.

18. A method for detecting a polynucleotide which encodes DsrA in a biological sample comprising:

(a) hybridizing the complement of the polynucleotide sequence which encodes a polynucleotide selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, and SEQ ID NO:17 to nucleic acid material of a biological sample, thereby forming a hybridization complex; and

(b) detecting the hybridization complex, wherein the presence of the complex correlates with the presence of a polynucleotide encoding DsrA in the biological sample.

19. The mutant *H. ducreyi* strain FX517, wherein the mutant does not encode or express DsrA.

20. A vaccine composition comprising purified protein DsrA or a fragment thereof in a pharmaceutically acceptable carrier.

21. A vaccine composition of Claim 20 further comprising another outer membrane protein of *H. ducreyi*.

22. A vaccine according to Claim 20 further comprising an adjuvant

23. A vaccine composition comprising a polynucleotide of Claim 1 in a pharmaceutically acceptable carrier.

24. A vaccine composition according to Claim 34 wherein the polynucleotide has the sequence SEQ ID NO:1.

25. A vaccine composition comprising an expression vector of Claim 8 in a pharmaceutically acceptable carrier.

26. A vaccine composition comprising the *H. ducreyi* mutant FX517 in a pharmaceutically acceptable carrier.
27. A DNA vaccine comprising an attenuated *H. ducreyi* strain.
28. A method for inducing a protective immune response in a subject at risk of developing *H. ducreyi* infection comprising administering to the subject a vaccine according to one of Claims 20-27 in an amount sufficient to induce an immune response.